POST PARTUM UTERINE INVOLUTION AND RESUMPTION OF OVARIAN ACTIVITY IN WHITE FULANI (BUNAJI) AND FRIESIAN BUNAJI COWS AS DETERMINED BY RECTAL PALPATION

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SUMMARY

The rate of involution of the uterus and cervix, and resumption of ovarian activity were studied in Friesian × Bunaji and purebred Bunaji Zebu cattle. Determinations of the above parameters were made by rectal palpation of the genitalia, visual observations and by vasectomized bulls for signs of oestrus.

Involution was found to be complete by 16 to 30 days for the crossbreds and 17 to 27 days for the Bunaji. The mean interval from parturition to first oestrus was 18.5 ± 2.9 vs 21.4 ± 5.4 days for the Bunaji and Friesian × Bunaji respectively. The interval between the first and second oestrus in the crossbred was significantly longer than in the purebred Bunaji ($P < .05$). By 60 days postpartum, all the Bunaji had exhibited no less than 3 oestrous cycles as against the Friesian crosses with a mean of 2.4 cycles. Cystic ovaries (6.9%), pyometra (6.9%) and anoestrus (13.8%) observed among the crossbreds were not seen among the Bunaji cows examined.

Calving records of the palpated cows were examined for their last three calvings under the range management practised on the farm. Three calving interval groups viz less than 322, 322 to 342 and above 342 days were recognized. In both breeds, most calvings were in the greater than 342 days interval, during which the Bunaji had longer calving interval ($P < .01$) in the penultimate calving than the crosses.

INTRODUCTION

One of the various factors controlling the calf crop in livestock establishments, is the calving interval. The optimal reproductive rate in livestock production is that rate which gives maximal economic profit per breeding female per year which also has an impact on the daily average milk production (Casida, 1968).

A low calf crop yield and long calving intervals associated with some cattle indigenous to tropical Africa, maybe due to some factors which have not been fully investigated, for example, uterine involution and the resumption of ovarian activity during the postpartum period. Long postpartum periods (70—110 days) and calving intervals (410—607 days) have been reported for the various Zebu breeds in Africa and India (Mahadevan and Marples, 1961; Rakha *et al,* 1970; Kimenye *et al,* 1978). These figures are pointers to low conception rates during the first 60 days postpartum in these breeds. A good conception rate during the postpartum period maybe achieved with fast recovery of the uterus and early resumption of ovarian activity.

Morrow *et al* (1966) reported that the interval from parturition to first observed oestrus varied from 30 to 76 days in dairy cattle and 40 to 48 days in beef cattle. The time required for uterine involution based on rectal palpations, clinical observations and measurements varied from 26 to 52 days in dairy cattle and 38 to 56 days in beef cattle. More recent studies by Marion and Gier (1968), Morrow *et al* (1969a,b) and Wagner and Hansel (1969) have shown that normal cows usually develop a mature follicle that ovulates and is followed by the formation of a corpus luteum at 13 to 15 days after calving. They also observed a high incidence of silent oestrus preceeding the first postpartum ovulations, and cystic corpora lutea and follicles.

Similar studies have hitherto not been carried out in Zebu cattle indigenous to West Africa. This study was therefore designed to investigated the rate of involution of the cervix and uterus, and resumption of ovarian activity in Bunaji and Friesian × Bunaji cows by means of rectal palpation and clinical observations as described by Zemjanis (1970). The results would also be examined in relation to the calving information of the same cows obtained from their last three calvings.

EXPERIMENTAL METHODS

Fifty Friesian × Bunaji and purebred Bunaji cows receiving supplements ration were involved in the study. The crossbreds were milked twice a day, morning and evening, while the Bunaji were nursing calves.

Following parturition, rectal examination of genitalia was carried out every two days until involution was considered complete and then weekly until sixty days postpartum. All examinations were done after the morning milking. During the examination, estimates of the diameters of the cervix and uterine horns at the bifurcation were made until no further changes were observed. Records were also kept of retained placenta, abnormal discharges and changes in ovarian structures to assess cyclical activity, and cystic ovaries.

Kamar heat detectors (Kamar Inc., Steamboat Springs, Colorado) were placed on the cows immediately after calving, and replaced every 14 days or after changes were observed. Oestrus was detected by use of vasectomized bulls which cause color changes in Kamar heat detectors when they mount. Visual observation for oestrous signs as well as the presence of mature follicles were additional aids. Ovulating follicles and subsequent development of corpora lutea were used to estimate oestrus in cases of silent heat.

Calving records of the palpated cows were examined for their last three calvings under the management practised on the farm. Information was compiled for the calving interval, age and parity of the cows for the two breed types. Differences between breed-types were tested by the Student t-test.

RESULTS

The time required for complete involution based on gross palpable features was 16 to 30 days for the cross-breds and 17 to 27 days in the Bunaji. In both breeds, the uterus was completely retractable by 16 days postpartum. Regression and involution of the cervix was generally faster than of the uterus. Upto 4 days postpartum, the cervix was non-estimable but declined rapidly in size between days 6 and 16. The uterine horns were non-estimable up to day 10 after which the diameter at the bifurcation reduced from about 10cm to a mean of 6.5 ± 1.1cm by day 16. Sloughing of the caruncle was completed by about 6 and 10 days postpartum in the Bunaji and Friesian × Bunaji, respectively.

The two breed types did not differ in their intervals from parturition to first oestrus (18.5 ± 2.9 vs 21.4 ± 5.4) days for Bunaji and Friesian × Bunaji, respectively — Table 1). However, the interval between the first and second oestrus in the crossbred was significantly longer than in the pure bred Bunaji ($P < .05$). Moreover, by 60 days postpartum, all Bunaji cows had exhibited not less than 3 oestrous cycles while their crosses with Friesian had a mean of 2.4 cycles. Infact, only 41.4% of the crosses had shown 3 cycles by day 60 postpartum. Sixty-five

TABLE 1

Involution and oestrus in Friesian × Bunaji and Bunaji postpartum cows (Days ± Standard deviation)

Observation	*FR X BUNAJI*	*BUNAJI*
Day sloughing of caruncles complete	9.6 ± 2.1	5.5 ± 0.7
Day involution complete	23.4 ± 7.3	22.1 ± 5.0
Day 1st Oestrus observed	21.4 ± 5.4	18.5 ± 2.9
Day 2nd Oestrus observed	43.7 ± 5.8	36.4 ± 3.5
Interval from 1st to 2nd Oestrus	22.4 ± 1.8[a]	17.9 ± 3.9[b]
Day 3rd Oestrus observed	63.3 ± 3.2	56.6 ± 5.1
Interval from 2nd to 3rd Oestrus	19.4 ± 1.9	20.3 ± 2.1
No. of cycles within 60 days post partum	2.4 ± 0.6	3.0

a,b Data with different superscripts are significantly different (*P ∢ 0.05).

TABLE 2

Calving intervals, age and parity of dams in the last three calvings of Bunaji and Bunaji × Holstein cows running with bulls during the postpartum period

Information[a]	*Latest Calving*		*Pernultimate Calving*	
	Bunaji	*Bunaji × Holstein*	*Bunaji*	*Bunaji × Hostein*
Calving Interval (CI) ∢ 322 days (days)	0.0	306.8 ± 16.0 (5)	303.0 ± 0.0(1)	313.0 ± 7.1 (4)
CI 322 to 342 days (days)	338.5 ± 3.3(4)	333.8 ± 7.3 (6)	0.0	355.0 ± 2.6 (3)
CI ≻ 342 days (days)	409.7 ± 43.1(3)	388.4 ± 59.1(18)	561.0 ± 118.9(7)	429.5 ± 62.4(18)**
Overal CI (days)	369.0 ± 45.5(5)	363.1 ± 57.7(29)	489.4 ± 133.2(8)	399.4 ± 72.4(25)*
Age of Dam (yr)	9.5 ± 2.8(7)	7.9 ± 2.9(29)	8.9 ± 3.2(8)	7.4 ± 2.7(25)
Parity	5.6 ± 2.0(7)	5.5 ± 3.1(29)	5.1 ± 2.4(8)	5.0 ± 2.8(25)

[a]Mean ± S.D. Number of cows is shown in brackets.

[b]One cow 16.5yr. old and with a parity of 10, had a calving interval of 1075 days (2.95yr.) and was excluded in all calculations.

*P ∢ .05), **P ∢ .01, between breed types.

percent of the first ovulations resulting in development of corpora lutea were without obvious signs of oestrus or Kamar change. Eighty per cent of the second ovulations were accompanied by complete Kamar changes.

The incidence of cystic ovaries was 6.9%, pyometra 6.9% and anoestrus 13.7% among the crossbred. Cystic ovaries, pyometra and postpartum anoestrus were no observed among the Bunaji cows examined. The ovaries, follicles and corpora lutea in the purebred were generally smaller than in the crossbred.

Three calving interval groups, viz less than 322, 322 to 342 and above 342 days, were recognized (Table 2). The Bunaji had no calvings in the less than 322 days interval during the last calving and in the 322 to 342 day — group during the pernultimate calvings in (Table 2). In comparison, the crosses had some calvings in all the interval groups. In both breeds, most calvings were in the greater than 342 days interval, during which the Bunaji had longer calving interval (P ∢ 0.1 in the pernultimate calving) than the crosses. Age and parity of the cows did not differ between the two breeds.

DISCUSSION

Results obtained compare favourably with those reported for other breeds (Morrow *et al* 1961, 1966, 1969; Wagner and Hansel 1969). This suggests that with good nutrition and management, calving rates in the Zebu breeds can be maintained at desirable levels.

Rahka *et al* (1970) had suggested that grazing in the drier months especially under some particular management regimes did not affect reproductive efficiency. The effect of nutrition on resump-- tion of ovarian activity was not investigated in this study.

The mean of two oestrous cycles observed during the first 60 days postpartum in the crossbreds (used primarily for dairy purposes) and three cycles in the Bunaji would suggest a lactational effect. There is information (Olds and Seath 1953; Saiduddin *et al* 1967; Wagner and Hansel 1969; Spalding *et al* 1975) that the interval from calving to first oestrus is greater in cows with higher production and in cows nursing calves or being milked 4 times daily. Our observation on percentage return to first oestrus only partially supported this view. The significantly longer interval between the first and second oestrus in the crossbreds would further indicate that the lactational effect was in play. Spalding *et al* (1975) further reported that heavier producing cows also had significantly lower conception rate to the first two services postpartum.

The lower early conception in the Bunaji than their crosses, as suggested by the past records reported here might have been indicative of herd management problems in range practice rather than a disagreement with Spalding and others (1975). It is possible, however, that earlier studies (Eckles 1929, Boyd and others 1954) were right when it was concluded that, inspite of the delay in return to first postpartum oestrus, reproductive performance did not appear to be adversely affected by the level of milk production. The range calving data reported here also appear to agree with Salisbury *et al* (1978) that conception is optimum following rebreeding 60 days and above during the postpartum period.

The higher incidence of cystic ovaries in the Friesian × Bunaji cows would also be linked to the higher production levels as indicated by Morrow *et al* (1966). The complete clinical involution of the cervix and uterus, and high percentage of complete Kamar changes before the second postpartum ovulation, is an indication that Zebu cows indigenous to West Africa and their crosses could settle to bulls at most 60 days after parturition if proper breeding management is established. This will ensure one calf per cow per year and thus increasing the livestock yield.

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